mission rates may thus be limited, for example, to those rates between the maximum rate and the minimum rate. The autonomous transmission rates may be limited to those rates between the minimum supported rate (rate N) and the maximum autonomous rate (rate M, in this example). The rate adjustment may be performed using any congestion control method, examples of which are described above with respect to FIGS. **6-9**.

It should be noted that in all the embodiments described above, method steps can be interchanged without departing from the scope of the invention. The descriptions disclosed herein have in many cases referred to signals, parameters, and procedures associated with the 1xEV-DV standard, but the scope of the present invention is not limited as such. Those of skill in the art will readily apply the principles herein to various other communication systems. These and other modifications will be apparent to those of ordinary skill in the art.

Those of skill in the art will understand that information and signals may be represented using any of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits, symbols, and chips that may be referenced throughout the above description may be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

Those of skill will further appreciate that the various illustrative logical blocks, modules, circuits, and algorithm steps described in connection with the embodiments disclosed herein may be implemented as electronic hardware, computer software, or combinations of both. To clearly illustrate this interchangeability of hardware and software, various illustrative components, blocks, modules, circuits, and steps have been described above generally in terms of their functionality. Whether such functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. Skilled artisans may implement the described functionality in varying ways for each particular application, but such implementation decisions should not be interpreted as causing a departure from the scope of the present invention.

The various illustrative logical blocks, modules, and circuits described in connection with the embodiments disclosed herein may be implemented or performed with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but in the alternative, the processor may be any conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

The steps of a method or algorithm described in connection with the embodiments disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium is coupled to the processor such the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components in a user terminal.

The previous description of the disclosed embodiments is provided to enable any person skilled in the art to make or use the present invention. Various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without departing from the spirit or scope of the invention. Thus, the present invention is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

What is claimed is:

1. An apparatus, operable with a plurality of remote stations capable of transmission on a shared resource, comprising:

a receiver for receiving a plurality of access requests for transmission on the shared resource from a respective plurality of remote stations and for measuring the utilization of the shared resource;

a scheduler for allocating a portion of the shared resource to zero or more of the requesting remote stations in response to the plurality of access requests, the allocation comprising zero or one common access grant to a subset of the requesting remote stations and for generating a tri-valued busy signal in response to the measured utilization; and

a transmitter for transmitting the common access grant to the remaining remote stations on one or more common grant channels and for transmitting the busy signal.

2. The apparatus of claim **1**, wherein:

the scheduler further allocates with an allocation further comprising zero or more individual access grants to zero or more requesting remote stations; and

the transmitter further transmits the individual access grants to the respective remote stations on one or more individual grant channels.

3. The apparatus of claim **1**, further operable with the plurality of remote stations equipped to transmit autonomously on the shared resource, using a limited portion of the shared resource, without an access request or access grant, and wherein:

the scheduler computes the expected amount of the shared resource to be consumed by the autonomous transmissions and allocates the portion of the shared resource for individual and common access grants in response thereto.

4. The apparatus of claim **1**, further operable with one or more remote stations transmitting with permission from one or more access grants, the apparatus further comprising:

a decoder for decoding one or more received packets and determining if the one or more received packets decoded without error; and

wherein:

the receiver further receives the one or more packets of data from one or more remote stations, respectively;

the transmitter further transmits to the one or more remote stations an acknowledgment and grant extension (ACK-and-Continue) command, respectively, when the respective received packet decoded without error and the access grant for the respective remote station is to be extended; and